Serial No. 10/688,714   Attorney Docket No. CS23196RL
Amdt. dated March 17, 2005
Reply to Office Action of December 17, 2004

Amendments to the Claims:

1.   (Currently Amended) An iterative method for reducing interference in a desired signal in

a GSM communication system using an alternate linear output filter, the method comprising:

inputting a burst of data of a received waveform including interference from a channel of

the communication system;

training the alternate linear output filter with a set of symbols of specific quadrature

phase, known a priori, in the burst of data of the received waveform;

operating on the received waveform with the alternate linear output filter to alternately

linearly equalize the burst of data to provide an estimate of the desired signal;

generating log likelihood ratio estimates for a plurality of bits corresponding to the burst

of data;

selecting a predetermined number of bits from the plurality of bits based upon a

predetermined condition of the generated log likelihood ratio estimates associated with the

plurality of bits;

augmenting the burst of data by assigning values to the selected predetermined number of

bits based on the set of symbols of specific quadrature phase with the selected predetermined

number of bits;

further re-training the alternate linear output filter with the augmented set of symbols; and

further re-operating on the received waveform with the alternate linear output filter to

alternately linearly equalize the burst of data to provide an improved estimate of the desired

signal.

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2.   (Original) The method of claim 1, wherein the set of symbols of specific quadrature

phase used for training the alternate linear output filter as a training sequence include at least one

of:

    midamble symbols of the burst of data;

    a set of leading zeros of the burst of data; and

    a set of ending zeroes of the burst of data.

3.   (Currently Amended) The method of claim 1, wherein the predetermined condition of the

generated log likelihood ratio estimates for selecting the predetermined number of bits is based

upon at least one of:

    magnitudes of largest generated log likelihood ratio estimates of the plurality of bits;

    magnitudes of largest generated log likelihood ratio estimates of the plurality of bits

exceeding a threshold magnitude; and

    magnitudes of generated log likelihood ratio estimates of the plurality of bits exceeding a

threshold magnitude.

4.   (Original) The method of claim 3,

    wherein the burst of data is GMSK modulated, and

    wherein alternating non-zero real and imaginary components of the midamble symbols of

the burst of data are extracted by training the alternate linear output filter.

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5.   (Currently Amended) The method of claim 4, wherein training the alternate linear output

filter includes minimizing a ~~the~~ sum-squared error between a linear real estimate of the real and

imaginary components of the training sequence of the alternate linear output filter and the

received waveform.

6.   (Currently Amended) The method of claim 1, wherein operating on the received

waveform with the alternate linear output filter includes multiplexing a ~~the~~ real and imaginary

components of the received waveform upon entry into the alternate linear output filter in vector

fashion.

7.   (Currently Amended) An iterative method for reducing interference in a desired signal in

a GSM communication system using an alternate linear output filter, the method comprising:

inputting a burst of data of a received GMSK waveform including interference from a

channel of the GSM communication system;

training the alternate linear output filter with a set of alternating non-zero real and

imaginary components of a training sequence, known a priori, in the burst of data of the received

GMSK waveform;

operating on the received GMSK waveform with the alternate linear output filter to

alternately linearly equalize the burst of data of the received GMSK waveform to provide an

estimate of the desired signal;

generating log likelihood ratio estimates for a plurality of bits corresponding to the burst

of data of the received GMSK waveform;

selecting a predetermined number of bits from the plurality of bits based upon a

predetermined condition of the generated log likelihood ratio estimates associated with the

plurality of bits;

augmenting the burst of data by assigning values to the selected predetermined number of

bits based on the set of alternating non-zero real and imaginary components of midamble

symbols with the selected predetermined number of bits;

further re-training the alternate linear output filter with the augmented set of alternating

non-zero real and imaginary components; and

further re-operating on the received GMSK waveform with the alternate linear output

filter to alternately linearly equalize the burst of data of the received GMSK waveform to provide

an improved estimate of the desired signal.

8.   (Original) The method of claim 7, wherein the training sequence includes at least one of:

        midamble symbols of the burst of data;

        a set of leading zeros of the burst of data; and

a set of ending zeroes of the burst of data.

9.   (Original) The method of claim 8, wherein the predetermined condition of the generated

log likelihood ratio estimates for selecting the predetermined number of bits is based upon at

least one of:

        magnitudes of largest generated log likelihood ratio estimates of the plurality of bits;

        magnitudes of largest generated log likelihood ratio estimates of the plurality of bits

exceeding a threshold magnitude; and

        magnitudes of generated log likelihood ratio estimates of the plurality of bits exceeding a

threshold magnitude.

10.   (Currently Amended) The method of claim 9, wherein training the alternate linear output

filter includes minimizing a the sum-squared error between a linear real estimate of the real and

imaginary non-zero components of the training sequence of the alternate linear output filter and

the received GMSK waveform.

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11.   (Currently Amended) The method of claim 7, wherein operating on the received GMSK

waveform with the alternate linear output filter includes multiplexing a̲ the non-zero real and

imaginary components of the received GMSK waveform upon entry into the alternate linear

output filter in vector fashion.

12.   (Currently Amended) A receiver with an alternate linear output equalizer for reducing

interference in a desired signal in a GSM communication system, the receiver comprising:

an analog-to-digital converter configured to convert an input signal that includes the

desired signal and an interference signal to a digital waveform;

a burst synchronizer coupled to the analog-to-digital converter, the burst synchronizer

configured to receive the digital waveform and to determine a synchronization delay between the

desired signal and the interference signal;

a matrix kernel constructor coupled to the analog-to-digital converter and the burst

synchronizer, the kernel constructor configured to receive the digital waveform, the delay, and a

real set of a training sequence derived from the digital waveform to construct an autocorrelation

matrix and a cross-correlation vector;

a filter parameter calculator coupled to the kernel constructor, the filter parameter

calculator configured to receive the autocorrelation matrix and the cross-correlation vector to

define linear tap estimates;

an alternate linear output filter coupled to the filter parameter calculator and the analog-

to-digital converter, the alternate linear output filter configured to receive the linear tap estimates

to operate on the digital waveform and output alternating real only and imaginary only symbols

to provide an estimate of the desired signal;

a log likelihood ratio generator coupled to the alternate linear output filter, the log

likelihood ratio generator configured to generate log likelihood ratio estimates for a plurality bits

of the digital waveform; and

a bit selector coupled to the log likelihood ratio generator and to the matrix kernel

constructor, the bit selector configured to select a predetermined number bits from the plurality

of bits based upon a predetermined condition of the generated log likelihood ratio estimates

associated with the plurality of bits, the bit selector further configured to provide the selected

predetermined number of bits to the matrix kernel constructor to augment an ~~the~~ observation

matrix and the training sequence.

13.   (Original) The receiver of claim 12, further comprising:

an output selector coupled to an output of the alternate linear output filter, the output

selector configured to direct the output alternating real only and imaginary only symbols from the

alternate linear output filter to one of the log likelihood ratio generator and an equalizer; and

a noise power estimator coupled to the log likelihood ratio generator, the noise power

estimator configured to provide an estimated noise power of the input signal.

14.   (Original) The method of claim 13, wherein the training sequence includes at least one

of:

midamble symbols of the burst of data;

a set of leading zeros of the burst of data; and

a set of ending zeroes of the burst of data.

15.   (Original) The method of claim 14, wherein the predetermined condition of the generated

log likelihood ratio estimates for selecting the predetermined number of bits is based upon at

least one of:

magnitudes of largest generated log likelihood ratio estimates of the plurality of bits;

magnitudes of largest generated log likelihood ratio estimates of the plurality of bits

exceeding a threshold magnitude; and

magnitudes of generated log likelihood ratio estimates of the plurality of bits exceeding a

threshold magnitude.

16.   (Original) The receiver of claim 15, wherein the burst of data is GMSK modulated.

17.   (Currently Amended) The receiver of claim 16, wherein the filter parameter calculator

minimizes a the sum-squared error between a linear real estimate of the real only and imaginary

only symbols of the training sequence of the alternate linear output filter and the digital

waveform.

18.   (Currently Amended) The receiver of claim 15, wherein the alternate linear output filter

multiplexes a the real and imaginary components of the digital waveform upon entry thereto.